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COMMERCIALIZATION OF RESEARCH RESULTS - GOVERNMENT POLICY OF KOREA*

by

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Commercialization of research results is of immense interest to the Korean Government since the effectivensess of the Government's support system can ultimately be measured by the degee of commercialization resulted from all the R&D* efforts. Although the Government does maintain some laboratories such as National Industrial Research Institute, the role of Government is more strongly felt through many of the measures and policy guidance to encourage the development efforts of the private industry, the semigovernmental research institutes and university community.

1. Government Policy to Promote Technology Development

A. Promotion of R&D by Tax Reduction

In the center of these policy measures is the Technology Development Promotion Law which was promulgated in 1972.
Under this law, the Government provides various tax incentives and financial support.
This is a system whereby the industry can set aside either up to 30% of profit or 1.5% of sales for research and development, and this technology development reserve fund, when used in either R&D or modification of imported technology within four years, is exempted from taxation.

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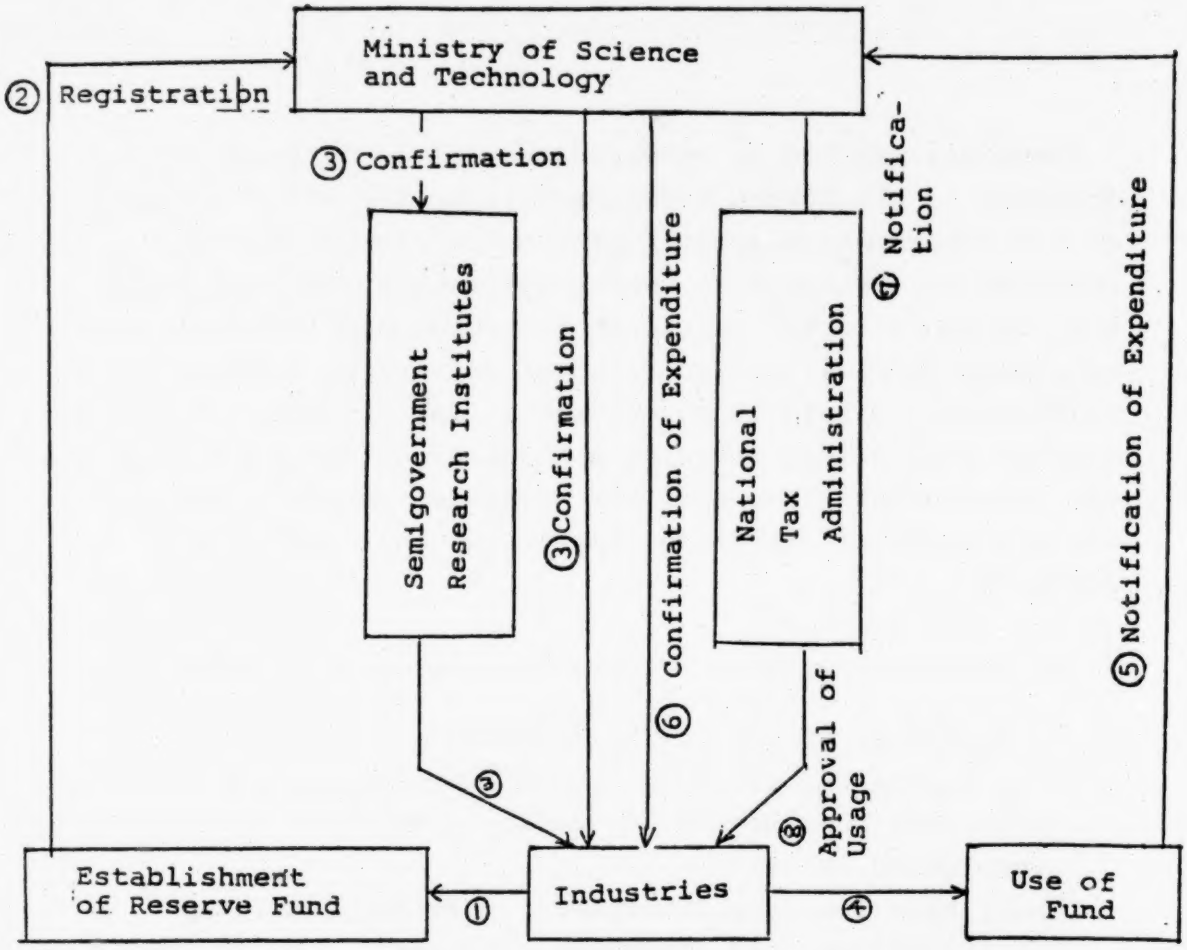
* Research and Development

Approval system for the technology development reserve fund is depicted below.



Under this system, the industry has the option of using the fund for their own research activities as well as to fund research projects at various national laboratories established with the endowments of the government but run autonomously (semigovernment research institutes).
The fund can be used not only for straight R&D but also for;

- Digestion and improvement of imported tedhnology,
- Acquistion of Technical information,
- Technical training and invitation of experts,
- Patent related activities, and
- Extablishment of development associations.

The fund therefore can be utilized for broad range of commercialization efforts.

Other policy measures for encouraging R&D activities are the tax exemption systems which can be summarized as follows.

- Reduction of corporation tax for the amount of up to 10% of investment in R&D and the training of technical manpower.

- Exemption of acquisition tax, property tax, registration tax for the estates acquired for R&D purposes by a company which has independent R&D facilities with more than 30 members of research staffs.

- The exemption of special consumption tax for the luxurious parts imported as samples for R&D purposes.

- Tax exemption up to 10% of investment or grant of special depreciation up to 50% of investment spent for purchasing machinery and equipment by a new venture utilizing domestically developed technologies.

- Reduction of special consumption tax up to 90% during first four years to expand domestic market for the items leading the technology development.

- Exemption of entire tax for the first 5 years on the income originated from licencing patent or sale of Know-how to a domestic entrepreneur, and reduction of income tax up to 50% when provided to foreign entrepreneur.

- Exemption of tax on the income from engineering services made during the first five years.

- Exemption of income tax for the foreign technical experts.

- Tax exemption for the capital gain originated from sales of stocks held by a venture capital company.

B. Financial Support for the R&D and Commercialization Activities.

Although the Government has enacted the Technology Promotion Law to assist all the development activities in Korea, the Ministry of Science and Technology (MOST) also decided to emphasize some high technology areas as prime area of concern for future growth of Korean economy. Areas emphasized are;

- Semiconductors and Computers,
- Specialty Chemicals,
- Upgrading of Machinery Industry,
- Energy and Resources Utilization,
- Systems Industry,
- Bioengineering Industry,
- Materials Industry,
- Textile and Polymer Industry,
- Construction/Environment/Plant Engineering.

R&D in these specified fields when undertaken by private industries can receive varying degrees of government fund which can be paid back within 5 years after commercialization.
Small and medium industries can receive up to 70% of required fund through careful screening processes in consideration of the high risk burden in the early stage of R&D.
Beside these industry-led projects, the Government can also provide fund for government-led, large scale and mission-oriented basic research projects in these fields.

Funds allocated for these efforts are sizable and contibuted greatly in stimulating R&D in Korea.
The increasing trend in resource allocation to the R&D activities in recent years in outlined as in the following table.

* Investment in Government-Industry Co-sponsored R&D projects

	'82	'83	'84
o R&D investment			
o Government	$16.7mill	$27.5mill	$27.5mill
o Private industry	$ 6.8mill	$15.6mill	$16.3mill
o No.of Participants	86	131	150
o No.of Researchers Involved	2,263	3,232	3,500
o No.of R&D Subjects	125	182	148

As a result of the continued support to the R&D related activities, a number of R&D results have been successfully commercialized in recent years. Typical projects among the successful ones are:

- Base material for semiconductor lead frame
- Mini-computer for education
- Medicine for distoma
- NMR-CT(Nuclear Magnetic Resonance Computer Tomography) for medical use.

C. Other Support for R&D promotion

Besides above financial support, the Government recommends large scale companies to establish their own research institute while small and medium companies are advised to organize research consortiums for their common areas for research.

Tax privileges and government funds have been extended to private research institutes as well as government funded

research institutes for carrying out nationally prioritized projects. Morever, researchers at private research institutes are allowed the same military conscription exemption as those at government funded institutes in order to facilliate securing and enlarging the research staffs for the private institutes. And researchers are compensated for their research efforts in the form of an incentive which is normally a proportionated portion of licensing and royalty income originated from their research results. At present, there are 129 private research institutes and 18 research consortiums in Korea.

On the other hand, small and medium industries, regardless of whether they were established from successful R&D results or not, are expected to confront with many technical problems which are usually not detected in the R&D stages or in routine operation.

Thus, in order to reinforce problem solving ability for the small and medium industries, technical consultation service by researchers and the dissemination of latest technological information are provided by the Industrial Technology Development Center (ITDC) attached to Korea Institute of Machinery & Metals (KIMM) with its highly sophisticated staffs and abundant technological information.

In addition, a technology assistance system by qualified researchers from government funded research institutes is being expanded for small and medium industries.

At the same time, financial supports from such financial organizations as Small and Medium Industry Bank(SMIB),

Korea Longterm Credit Bank (KLB), venture capital companies, Korea Credit Guarantee Fund (KCGF), Korea Development Bank (KDB), and Small and Medium Industry Promotion Corporation (SMIPC) are available for the industry in the fields of the establishment of business venture, acquistion and erection of R&D facilities, installation of facilities for training technical manpower, import of technology and digestion of imported technologies.

2. Venture Capital and Venture Business

Another promotional measure which the Government can enact to stimulate the commercialization of R&D results is the establishments of venture capital fund and organizations. In 1983, the Government authorized the financial and insurance companies to utilize the Technology Development Promotion Law to establish venture capital companies. Under this arrangement, companies can claim tax exemption when they invest in venture capital company. In 1984, the Government has decided to increase the capital of KTDC and K-TAC as a part of this plan. MOST also has decided to increase the New Technology Based Company Formation Fund from 1.4 million dollars 2.5 million dollars in 1984.

Venture capital company provides financial support for:

1) industry's in-house R&D activities and contracts with research institutes,

2) the first commercial exploitation of R&D results and direct or indirect investment in R&D,

3) technology transfer fees, improvement and digestion of advanced foreign technologies,

4) introduction of advanced foreign engineering technology, development and promotion of local engineering capabilities. So far, four venture capital companies have been established in Korea and they are outlined as in the following table.

* Venture capital companie in Korea

	K-TAC	KTDC	KDIC	KIFC
Establishment	1974	1981	1982	1984
Capital	$2.0million	$19.0million	$8.5million	$12.5million
Shareholders	KAIST	Government, Private industries	Short term credit financial companies, IFC	KDB
Main Function	.Commercial promotion of new R&D results .Investment in new commercialization projects.	.Sales of Know-How .Investment in R&D projects	.Investment, financing for new and expansion projects	Same as KDIC

In general, the venture capital company offers financing in the form of

1. conditional loan which is repaid on a royalty basis in proportion to sales amount if the project is succeeded in business and if it fails, only a small portion of the principal is recovered,

2. Equity participation in a new venture as requested by an enterprise for alleviating cost of money,

3. Providing loans on credit basis to the companies with promising technology but without proper collateral for financing new projects,

4. Conventional loans as those offered by commercial banks.

Such financial support for technology development by the banks and venture capital companies increased from 92.5 mill. dollars in 1982 to 194.4 mill. dollars in 1983.

The financial support made by KTDC, which is a typical venture capital company in Korea, is analyzed in the two separate viewpoints as in the following tables.

1) Financial support by commercialization stages

Unit:million dollars

Steps	'81	'82	'83
. R&D	7.4	22.9	40.8
. Commercializing of R&D results	0.1	3.1	9.5
. Acquisition of R&D facilities	0.1	1.6	12.1
Total	7.6	27.6	62.4

2) Financing record by loan type

Unit : million dollars

Type	'81	'82	'83
Venture capital			
. conditional loan	0.6	2.3	1.3
. equity investment	0	0.4	1.3
. loan on credit	2.6	10.8	37
Sub total	3.2	13.5	39.6
. Conventional loan	4.4	14.3	22.9
Total	7.6	27.8	62.5

The Ministry of Finance is also planning to establish the over-the-counter stock market to channel venture-oriented fund to new venture projects. Such kind of governmental efforts, if successful, attract valuable funds which otherwise may not be used for industrial development.

The problems in implementing such plans, however, deserve some attention. For example, Korea at this time needs to have more commercializable R&D results that are ready for immediate input of funds. We also need to create an environment such that young entrepreneurs in large industry can take the risk of creating new ventures.

Several measures can be taken to alleviate the situation. These are;

1. Creation of favorable environment by easing the conditions of entering the stock market for high-tech companies

2. Establishing a law enabling the use of various pension funds to be used by investment companies.

3. Allowing the investment trust companies to invest in venture capital companies.

4. Establishments of additional venture capital companies by private industries and banks.

5. Organized effort to provide more investment opportunities to potential investors.

3. Conclusion

The Government policies however must be well administered to yield desired results. The domestic development also should be balanced with careful technology transfer from abroad.

In Korea, the induced technologies have played a vital role in its industrialization process during the 1960s and 1970s.

For the last several years technology inducement has increased rapidly with the royalty payments going up to us $150million in 1983.

Since the trend at present is an open door policy for foreign investors who want to invest in Korea.

The Government in 1980 adopted an automatic approval system to facilitate the technology transfer from abroad in virtually all industrial fields. Furthermore, in 1984, the Government changed the approval system to a report system to make the technology inducement faster and more efficient. It is believed that this policy will ultimately strengthen Korea's R&D capability.

But concurrently, Korea will continue to nurture domestic effort to create and adapt new technology which is so vital to the future development of Korea. We hope this brief outline of Korean experience will be of help to our friends who may face similar problems.